

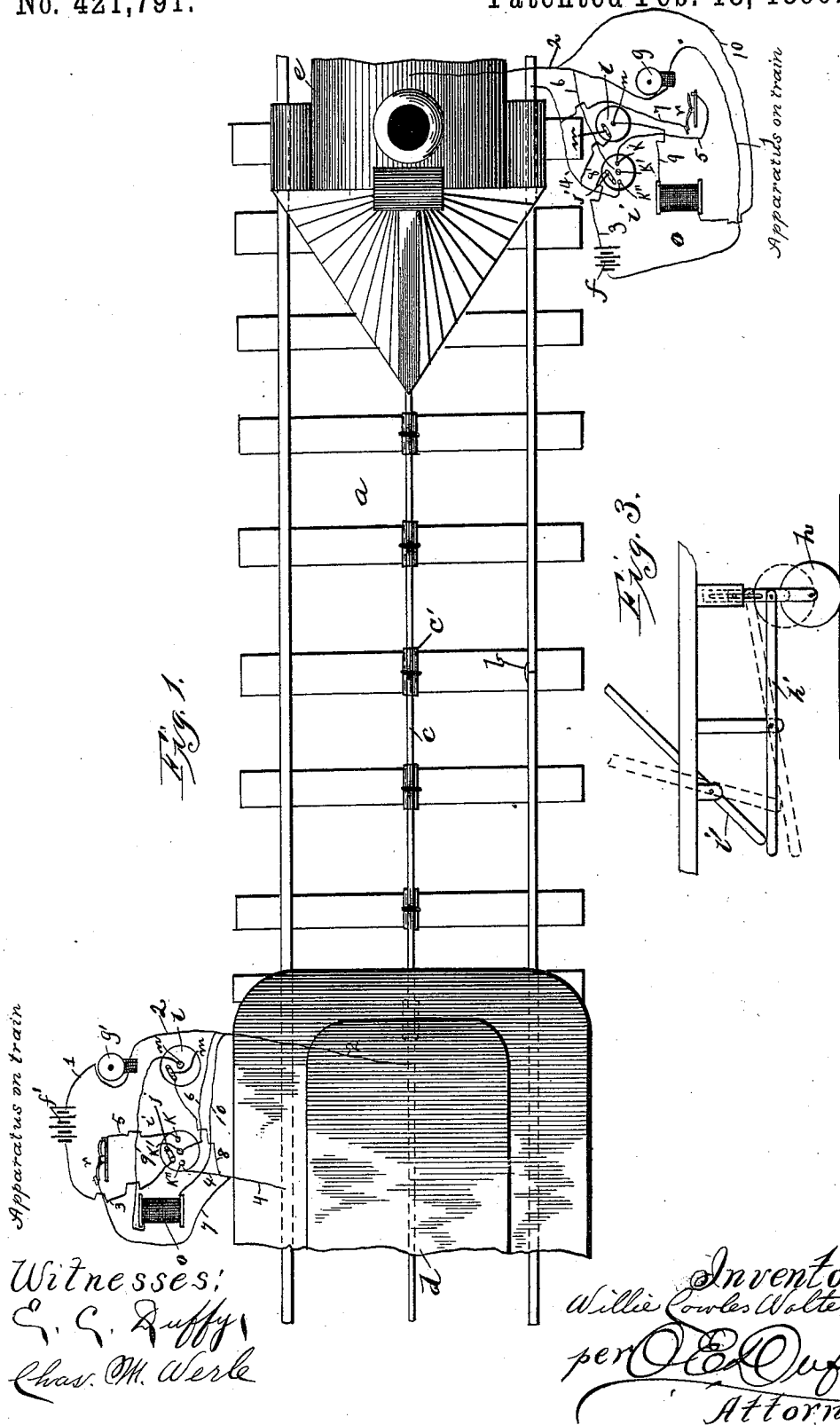
(No Model.)

2 Sheets—Sheet 1.

W. C. WALTER.
ELECTRIC RAILWAY SIGNAL.

No. 421,791.

Patented Feb. 18, 1890.



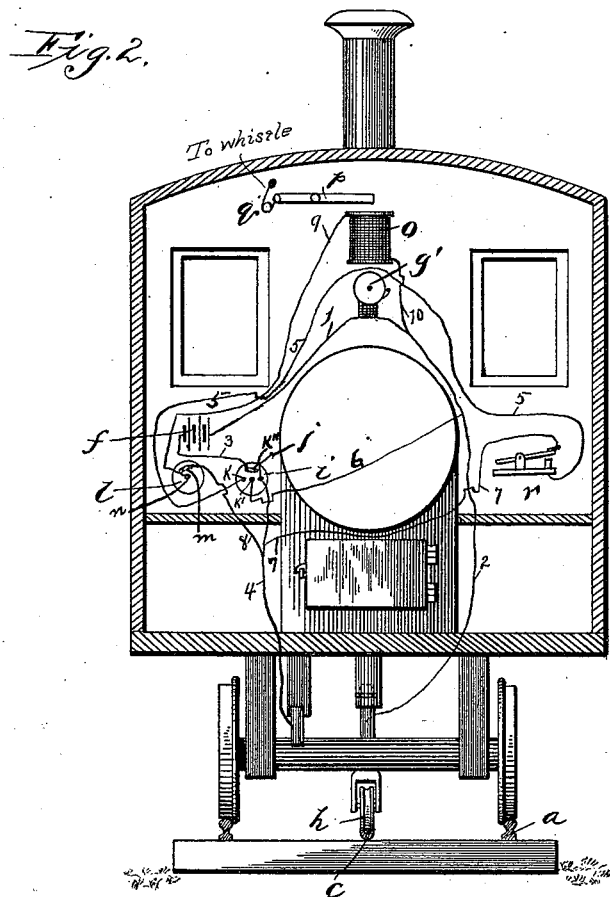
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Witnesses;
E. C. Duffy
Chas. M. Werle

Inventor
Willie Fowler Walter
per E. E. Duff
Attorney

UNITED STATES PATENT OFFICE.

WILLIE C. WALTER, OF RICHMOND, VIRGINIA, ASSIGNOR OF ONE-HALF TO
GEORGE B. McADAMS, OF SAME PLACE.

ELECTRIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 421,791, dated February 18, 1890.

Application filed May 29, 1889. Serial No. 312,501. (No model.)

To all whom it may concern:

Be it known that I, WILLIE COWLES WALTER, of Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Electric Railway-Signals for Giving Notice of Danger; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form part of this specification.

My invention relates to certain improvements in electric railroad-signals.

The object of the invention is to provide an improved electrical signaling device for trains, whereby the engineers on two trains on the same track are placed in communication, so that both engineers will be notified by suitable alarms when the trains approach each other, and whereby the engineers on two trains can control the circuits, so as to be placed in communication and be able to transmit intelligible signals from one moving train to the other by means of common telegraph-keys and electric gongs or other alarms on each train, whereby the whistles of one or both of the trains can be sounded from the other train either as a danger-alarm or to notify of the desire of one engineer to communicate with the engineer on the other train, or each engineer can so set the signal that his whistle will be sounded when another train approaches him or his train approaches another on the same track, and whereby each engineer can test his own batteries, gongs, &c., at any time. These objects are accomplished by and my invention consists in certain novel features of construction and in certain combinations of parts more fully described hereinafter, and particularly pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a plan view of a length of railroad-track, showing in diagram two trains approaching each other thereon. Fig. 2 is a cross-section of a locomotive and track. Figs. 3 and 4 are details of parts of the apparatus.

In the drawings, the reference-letter *a* indicates a railroad-track, having the series of rails on one or both sides electrically connected to form a continuous electrical conductor, the adjoining ends of the separate rails being preferably connected by short lengths of copper strips or wire *b*, soldered or otherwise fastened to the ends of the rails with sufficient slack to allow for expansion and contraction of the rails. A continuous conductor *c* extends the length of the track between any two stations or points, said conductor being located between the rails and suitably secured to the sleepers or other supports.

In Fig. 1, *d* and *e* indicate two trains or locomotives approaching or receding from each other on the track, and provided with the batteries or sources of current *f f'* and the electrically-operated bells or gongs *g g'*. In each locomotive one pole of the source is connected by connections 1 2 with a contact wheel or brush *h*, located beneath the locomotive or car and running on the central conductor *c* on the track, and the electric bell is located in this portion of the circuit between that pole of the battery and said contact-wheel. The opposite pole of the source of each car is connected by connections 3 4 with an axle of its respective car, and through the axle and wheel to the rails, which form a conductor. Thus it will be seen that if the circuits in each car were closed when two cars are located on a track, as shown in Fig. 1, a circuit will be closed between the batteries and bells of the two cars and over the connected rails and said central conductor, thereby sounding the bells and notifying the engineers.

As the connections and devices in each car are similar, the devices in one only will be described.

A three-way switch *i* is conveniently located in the locomotive-cab, (or other desirable position in a car;) also, a single-way switch or circuit closer *l*, adapted to close a circuit to energize an electro-magnetic device *o*, the armature *p* of which is connected by the cord *q* with the mechanism or valve for opening the way for the steam to sound the

whistle of the locomotive when the magnetic device *o* is energized. A telegraph-key *r* is also conveniently located in the cab, with its stationary and movable contacts normally held from engagement by a spring, as usual. The switch-lever *j* of the three-way switch *i* is directly connected with one pole of the source *f* by the connection 3. The first contact-point *k* of said switch is connected with the stationary contact-point of the telegraph-key by connection 5. The second point *k'* of said switch is connected by connection 6 with the opposite pole of the source through the medium of the connection 2, mechanism of bell *g*, and wire 1, and the third contact *k''* of the switch is directly connected with the conducting-rails through the medium of the conductor 4 and an axle and wheel of the car. The movable contact or lever of the telegraph-key is connected with the conductor 4 by the connection 7, and the lever *m* of the circuit-closer is connected with the connection 4 by the connection 8, and the stationary point *n* of said circuit-closer is connected with the connection 2 through the medium of the connections 9 and 10, extending through the magnet *o*. Each stationary point of the three-way switch can be suitably labeled to indicate the circuit closed when the lever is placed on that point; hence, if the engineer wishes to communicate by signals with the engineer of another train, the lever *j* is placed on the first point *k* and the key operated; or if he wants to test his own apparatus he places the switch-lever on the second point *k'*; or if he wants to connect the parts so that the alarm will be sounded by the approach of another train the switch-lever is placed on the third stationary point *k''*; or if he wants to be notified of the approach of another train by the sounding of his whistle the engineer places the contacts *l n* of the circuit-closer in engagement and throws the switch-lever from contact with any of the points of the switch, or the switch-lever *j* can be left in contact with any of said points except the point *k*.

When the switch-lever *j* of car *d* is placed on first contact *k* of the switch, the circuit in car *d* is from conductor *c* through wheel *h*, wire 2, bell-magnet *g'*, wire 1, battery *f*², wire 3, lever *j*, point *k*, wire 5, telegraph-key, (when closed,) wire 7, wire 4, and axle and a wheel to and through the conducting-rails to the other car *e*, and through the battery and bell-magnet of that car *e* to the conductor *c*, so that when the key is closed in train *d* the circuit will be closed and the bell rung in car *e*. Thus it will be seen that the engineers can have a predetermined key or system of signaling. For instance, so many strokes or a short stroke of the bell might mean "Which way are you going?" and a longer stroke mean something else, and the engineer on the train, having his key in circuit, can sound the alarm of the other train by operating his key. Before starting out on a trip,

if the engineer wishes to try his batteries and circuits and see if everything is in good working order, he short-circuits the source and alarm of his own train by placing the switch-lever on the middle contact-point *k'*, whereby a circuit is formed from one pole of the source through wire 3, lever *j*, point *k'*, wire 6, wire 2, bell, and wire 1 to the opposite pole of the battery, thereby forming a complete circuit in the car, and if everything is as it should be the bell is sounded.

If the engineer on one train desires to have his whistle sounded upon the approach of another train, (which other train should have its switch so set that the battery will be included in the circuit from the conducting track-rails through the car to the conductor *c*.) he places the switch-lever on any of the switch-points, except the middle point *k'*, and places the movable contact *m* of the circuit-closer in engagement with the stationary contact *n*, thereby placing the whistle-magnet *o* in a shunt-circuit 8, 9, and 10 from the two main conductors 4 and 2. The magnet *o* in this shunt-circuit is of less resistance than the bell-magnets, so that the current, when the other train approaches, will not pass through the bell, but will pass through the shunt-circuit and actuate the whistle-magnet to sound the whistle.

When it is desired to connect the conducting-rails of the track and the conductor *c* by a circuit through the train, including the source and alarm, so that if the conducting-rails and conductors are connected the bell will ring, the switch-lever is placed on the last contact *k''*, thereby forming a circuit from conductor *c* through wire 2, bell *g*, wire 1, battery *f*, wire 3, lever *j*, point *k''*, and wire 4 to the conducting-rails of the track. Thus it will be seen that if the rails and conductor *c* are electrically connected, as by a circuit through another approaching car, the alarms will be sounded and notice given of danger in time to prevent an accident.

Fig. 4 shows the manner of securing the central conductor *c* to and insulating the same from the supports or sleepers. At each sleeper a slight downward bend is formed in the conducting wire or cable *c*, and at this point the wire is embraced by a tube *c'*, of insulating material, and the cable is secured to the sleeper by a staple bearing on the tube and resting in said bend, thereby securing the conductor to and insulating the same from the sleepers, and the insulating-tubing will break the jar of the wheels *h* when crossing the bends in the wire.

In order to avoid the wear and injury to the wheels *h* which would be the result when crossing switches and cross-tracks, this wheel is carried by a standard secured to the bottom of the car or tender to allow vertical play. A horizontal lever *h'* is pivoted beneath the car, and one end is loosely secured to the standard carrying the wheel *h*, and the opposite end of this lever is engaged on the upper

end by the lower end of a pivoted lever *v'*, pivoted to swing in a vertical plane and normally located at an angle, as shown, with its handle-end extending up into the car, so that when the car approaches a switch or cross-track the engineer can draw the handle end up, and thereby swing the horizontal lever, to lift the standard of the wheel *h* and raise the wheel a distance from the conductor. (See Fig. 3.)

A track-walker or other person can communicate with a train on the track at any time by electrically connecting the conducting-rails and central conductor.

It should be observed that the conducting-rails are connected together to form a continuous conductor, and that the central conductor is continuous and not broken up into sections or block systems. Thus the distance that the device will operate between two trains depends on the strength of the batteries employed, and the alarms of the trains are in circuit all the time that the trains are on the track; but the bells are not rung until the resistance of the circuit is sufficiently reduced.

The term "car" is used throughout the specification as a generic term to cover train, locomotive, or any vehicle on the track.

It is evident that various slight changes might be made in the form and arrangement of the parts described without departing from the spirit and scope of my invention; hence I do not wish to limit myself to the precise construction and arrangement herein set forth.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. An electric railway-signal consisting of a railroad-track having the rails on one side electrically connected at the ends to form a continuous conductor, a parallel continuous conductor located between the rails and insulated therefrom, two vehicles on the track, each vehicle provided with a circuit connected with said two conductors, a source of electricity in each circuit, an electric alarm in each circuit, each vehicle being provided with a telegraph-key in a short circuit from the main circuit, a multiple switch in the main circuit, whereby said key can be thrown into or out of the main circuit, and a short circuit connecting said alarm, source, and switch, so

that the same can be short-circuited by the switch from said two conductors, for the purpose set forth.

2. An electric railway-signal consisting of a railroad-track, a pair of parallel continuous conductors insulated from each other, two moving vehicles on the track, each vehicle being provided with a main electric circuit connected with said conductors, a source of electricity in said circuit, an electric alarm in said circuit, adapted to be sounded when the circuit is closed, a multiple switch in said main circuit, a short circuit in the vehicle including said switch, source, and alarm, whereby the same can be short-circuited from said two conductors, for the purpose set forth, a telegraph-key in a short circuit from the main circuit and connected with said switch, so that the key can be thrown into or out of the main circuit, an electro-magnetic device controlling the whistle-blowing mechanism and located in a short circuit from said main circuit, and a circuit-closer in said last-mentioned short circuit, substantially as described.

3. An electric railroad-signal consisting of a track, a pair of parallel conductors insulated from each other and extending along the track, a pair of moving vehicles on the track, each vehicle having a circuit connected with said two conductors, a source of electricity in said circuit, an electric alarm in the circuit, a multiple switch having its movable and a stationary contact connected with the main circuit, so that the switch is located in said circuit between one of said conductors and the source and alarm, a short circuit connected with another stationary point of said switch and with the main circuit between one of said conductors and said source and alarm, for the purpose set forth, another short circuit connected with another stationary point of the switch and said main circuit, and a telegraph-key in said last-mentioned short circuit, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

WILLIE C. WALTER.

Witnesses:

O. E. DUFFY,
C. M. WERLE.